Radiation Safety Training

Open Source Orientation
Self Study Assignment

University of Manitoba
Revised December 16, 2019

Please register with Radiation Safety by completing the Personal Registration and Consent Form to secure a spot for the workshop and obtain a mentor. Current registration form – here.

Print or write clearly or circle!
All responses must be on this printed document by the student. This assignment will be used to assess your competence in order to be listed as a designated worker on an Internal Radioisotope Permit. Please answer the questions in a manner to demonstrate your understanding of radiation safety.

Prior to completing the assignment – read or review the individual documents linked under "Self Study Assignment" on the web at: http://umanitoba.ca/admin/vp_admin/risk_management/ehso/rad_safety/RadOSOrientation.html

Name of Student completing the assignment: _____
(Please underline your family name)

Send the completed assignment electronically
Scan and e-mail to: radsafety@umanitoba.ca or Fax to: (204) 789-3906

Bring the original completed assignment to the workshop or
provide it to your department office as a training record

Section 1: Basics of Radiation:

1. What is the difference between X-rays and gamma rays?

2. Sulfur -35 (16 protons) is unstable, radioactive and emits electrons. What element will S-35 change to after loosing an electron during the decay process: (circle one)
   a. Phosphorus (15 protons)
   b. Chlorine (17 protons)
   c. Will stay as Sulfur

3. You just received ATP labeled with P-32. However, you cannot start your experiment right away. By placing the vial into -80^{0}C freezer: (circle one)
   a. The rate of radioactive decay will be slowed down by 10-20%
   b. The rate of radioactive decay will be slowed down by 90-100%
   c. The rate of radioactive decay will not be affected

4. What is a Becquerel?

Section 2: Exposure risks:

5. The exposure you receive from background radiation is higher than the regulatory exposure limit for a member of public. (circle one)

True / False

6. You must always take your dosimeter badge with you when planning to have an X-ray exam. (circle one)

True / False

7. Everybody who receives a dose of 1000 mSv will develop cancer. (circle one)

True / False

8. List four ways how to control your <u>whole body exposure</u>.
    a.
    b.
    c.
    d.

9. Choose one of the five listed preventative measures to minimize radioactive material from <u>entering your body</u> and explain why this measure is the most important one.

Section 3: Legal Requirements:

10. Name the federal regulatory agency that has control of radioactive material in Canada.

11. List four items of information that can be found on the Internal Radioisotope Permit.
    a.
    b.
    c.
    d.

12. The radioactive stock vials shall be secured in a locked box, cupboard or fridge at all times and the key shall only be accessible to designated workers listed on a permit. (circle one)

True / False

13. What does it mean when purple and yellow stripped tape is displayed on a mini-centrifuge? Circle all that apply:
    a. You must wear a lab coat and disposable gloves to open the mini-centrifuge.
    b. You must monitor the centrifuge for removable radioactive contamination within seven days of using it.
    c. You can move it to a non-permitted room.
    d. You must decontaminate, decommission, remove the radiation warning symbol or stripped tape before sending the mini-centrifuge for repairs.

Section 4: Contamination Monitoring:

14. Define decontamination level.

15. Describe the difference between the CNSC contamination limit and the decontamination level at The University of Manitoba?

16. Describe the difference between direct and indirect monitoring.

17. What information is required to be included on a contamination monitoring record/form.

18. When is contamination monitoring required (there are three situations)?
    a.
    b.
    c.

19. What is decommissioning and when is it required when radioactive material is involved?

20. How are CPM and DPM related?

Section 5: Ordering/Inventory Control:

21. If I have a UofM credit card, I can order radioactive material over the phone. (circle one)
True / False

22. Non-certified personnel may only receive Excepted Packages while certified personnel may receive and open a package of radioactive material labelled with a TDG symbol. (circle one)
True / False

23. When your source vial is no longer needed, you will: (circle one)
    a. Monitor for contamination and then dispose of it into regular waste
    b. Return the stock vial to EHS and keep the Inventory Record in the Radiation Safety Records binder.
    c. Return the stock vial to EHS with the gold Inventory Record and keep a copy (on white) in the Radiation Safety Records binder.

Section 6: Using Radioactive Materials Safely:

24. Shielding a mid-energy beta emitter with lead may cause the production of secondary radiation in the form of X-rays due to Bremsstrahlung. (circle one)
True/ False

25. You are working with I-125 and your glove breaks. You remove your glove, wash your hands under warm water and monitor for contamination. You MUST report this incident to the Radiation Safety Officer.
True/ False

26. You are setting up a work area for P-32 on a bench. What will you use? (circle one)
    a. Plexiglass shielding, absorbent plastic backed pad and waste containers
    b. Leaded-glass shielding, absorbent plastic backed pad and waste containers
    c. Plexiglass shielding, uncovered bench and waste containers

Section 7: Waste Disposal:

27. Why is it important to indicate the waste components in the chemical/biological components section of the waste tag?

28. How would you dispose of a scintillation vial after counting a sample? Hint: liquid MUST be disposed of separately form solids.

29. You can use a biological sharps container to collect non-biological sharps. (circle one)
True/ False

30. After one month, the lower part of the waste tag is to be filled in for the solid waste (gloves, paper towels, plastic tubes) generated from using 37MBq of P-32. Estimate the activity of the solid waste, assuming that about 10% of the activity is in this waste.

Section 8: Emergency Response:

31. Find The University of Manitoba Radiation Safety Emergency Procedures and review the RSP related to Radiation Emergency Response at:
http://umanitoba.ca/admin/vp_admin/risk_management/ehso/media/RadMan17-1_ER.pdf
And
Section 11. Spill or Unplanned Release Procedure
http://umanitoba.ca/admin/vp_admin/risk_management/ehso/media/RadMan17-3_OS.pdf

32. The day of the Radiation Safety Workshop, you will work in pairs to clean a radioactive spill of Tc-99m. What questions you would like to have answered prior to the spill on lab day:

Declaration: By signing below, I have acknowledged that I personally have completed all the submitted answers to the questions.

Signature of person completing the assignment: _____

Date of Signature: _____

Name of Permit Holder: _____